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STSS 4270 – Sustainability Problems

Final Exam, 12/5/2014

1) *Discuss the relationship between corporations and sustainability. Include at least four references from this semesters annotations. (829 words)*

The traditional relationship between corporations and sustainability was based on minimum compliance with government regulation. Today, the fundamental structure remains the same – a corporation's main concern is to profit, factoring in the cost of government fines into their decisions but not the underlying sustainability problems. However, at the margins, there has been a fundamental shift in how corporations interact with sustainability. These changes are being driven by the Internet age, which drastically changed the interactions of customers and companies. Additionally, the rise of the benefit corporation has created an avenue for corporations to factor sustainability into the heart of their businesses.

The main objective for any corporation is to deliver value to its stakeholders. For publicly traded companies, stockholders hold the corporation to delivering maximum profit. These large, publicly traded corporations comprise the majority of the economy, and their traditional outlook toward sustainability must be considered first and foremost when examining corporate sustainability. Corporations influence many aspects of sustainability including environmental, legal, social, cultural, media and economic.

Traditionally, the government has wielded the most power over corporations. When government fines and penalties are severe enough, companies must take sustainable actions to preserve their profits. With the creation of the Clean Water Act in 1972, the EPA was given substantial authority to regulate polluters, and as a result there was a dramatic improvement in water quality across the country. As shown by the PBS Frontline documentary *Poisoned Waters*<sup>[1]</sup>, the corporations impacted by this legislation only complied when it was profitable to do so and actively lobby to reduce the power of the EPA. This highlights the political and environmental sustainability problems with large corporations. The corporations do not account for external factors such as the environment when making business decisions, and actively work against environmental conservation through regulation. However, if the regulations are in place, they can be an effective tool to force corporations to act more sustainably.

In the PBS Frontline documentary, *The Persuaders*<sup>[2]</sup>, the advertising strategies and social sustainability problems created by large corporations were examined. The film shows how the

advertising techniques employed by these large corporations become less and less effective over time, requiring advertisements to be bigger and louder to get the same reaction from consumers. Additionally, it highlighted how companies' huge unsustainable advertising expenses are necessary to be competitive in the current economic system. If the system was changed, companies could instead spend that money to get sustainable sources for their products or to give back to their local communities.

In the 2003 film *The Corporation*<sup>[3]</sup>, large companies like Pfizer are shown to spend money to improve local communities only when it is in some alternative interest of the company. In Pfizer's case, it funded a renovation of the local subway station and paid for security to gain positive publicity. The film also showed how the organization of corporations removed power from the individuals it is comprised of. Political sustainability problems are evidenced by the massive influence of money on politics. A politician cannot even think of running for office unless they have corporate money backing their campaigns. Despite these large sustainability problems, their largest sustainability problem is in their unmatched economic efficiency. It is almost impossible for a small company to compete with a modern corporation on cost, which poses a major problem for the balance of economic power.

Recently, many states have recognized the benefit corporation as a new legal basis for creating and governing public corporations. The B-corp allows companies to define different measures of value besides profit, and protects corporations from lawsuits by shareholders on the basis of profit maximization. As shown in the 2014 film, *Not Business as Usual*<sup>[4]</sup>, the benefit corporation allows business owners and CEOs to make business decisions they feel best represents their company. This has created a plethora of new businesses that are not only profitable, but are also sustainable. The film referenced the fact that benefit corporations have posted higher profits than competitors for the past 10 years, while using sustainable goals. This remarkable success is due to changing consumer preferences, and ultimately it is the consumers who drive the economy.

Along with the ability for consumers to choose to shop locally or buy from benefit corporations, consumers gained more power over corporations with the rise of the information age. The internet and social media allow consumers to expose a corporation's sustainability problems, and

provide a platform on which to hold corporations accountable. However, the internet also lowers the costs for companies to advertise to consumers, and incentivizes them to make green claims.

The core of corporate America remains as it was decades past – singularly focused on turning a profit for its investors. However, legal and technological changes have generated tangible benefits for the consumer and society. Although these new corporate structures and consumer power are currently small compared to the corporate establishment, they are growing and show promise in changing corporations from a sustainability problem to a sustainability solution.

Annotation References:

1. **Young, Rick.** *Poisoned Waters*. FRONTLINE, 2009.
2. **Goodman, Barak and Dretzin, Rachel.** *The Persuaders*. FRONTLINE, 2003.
3. **Achbar, Mark and Abbott, Jennifer.** *The Corporation*. Big Picture Media Corporation, 2003.
4. **Lam, Lawrence Le and Klinge-Watt, Rik.** *Not Business as Usual*. 2014.

2) Describe how science can be a sustainability problem; referencing at least four examples from films you watched this semester. (837 words)

While science and technological advancement shows promise as a solution to many sustainability problems, advances in science and technology can often be sustainability problems themselves. While increased efficiency is often touted as a path to sustainability, the unsustainable reality is that the lower cost of utilization often encourages more use.

Technological innovations can also lower the cost of exploiting natural resources, and can give humans the means to use resources unsustainably. Coupled with the current legal and political framework, brilliant technological innovations can be used to the detriment of the environment and society while allowing a few individuals to profit. Additionally, the development of technology can extend the use and lifespan of unsustainable practices, delaying the implementation of more sustainable alternatives.

It is often the case that overall consumption increases after developing new technology aimed at increasing efficiency and reducing consumption. This is known as Jevons paradox, and was first seen with coal-burning factories in England. When new technology was created to reduce pollutants emitted and the amount of coal required to run the plants, more plants were built and total pollution increased. This example is poignant in the modern era of oil, and is similar to the narrative shown in the film *The End of Suburbia*<sup>[1]</sup>. The film details the history of the automotive age in America, and how the scientific innovations that increased the efficiency of the internal combustion engine also led to the creation of environmentally unsustainable American suburbs. With the renewed focus on gas mileage spurred by EPA regulations, the automotive industry is producing more fuel efficient cars every year. In order for these regulations to not lead to more consumption, the regulation-mandated efficiencies must outpace the abilities of automotive manufactures to produce efficient cars at low prices. This way, there will be fewer people driving in addition to increased gas mileage.

Besides technologies that widen the application of petroleum products, technologies that enable resource extraction can be sustainability problems. In the film *Blind Spot*<sup>[2]</sup>, the history of the world's oil extraction is examined. Because of more efficient extraction techniques, more oil can be taken from the ground profitably. Aside from the environmental sustainability problems with oil, this led to an era of cheap energy when societies and cultures were organized around the low

cost of transportation, heat, and electricity. When the world experiences peak oil, these unsustainable societal structures and cultures will be forced to change. Similar to the narrative of the non-renewable resource of oil, the renewable fishing industry was disrupted by advances in technology. In commercial fishing, advances in engineering allowing for larger boats, better net materials, and more advanced trawlers enabled humans to profitably exploit fishing grounds. Previously, humans could fish as much as they possibly could but remained at catch levels that the fish population could restore year after year on their own. Technology has allowed commercial fisheries to catch as much as they want, damaging the ocean ecosystem. As shown in the film *End of the Line* <sup>[3]</sup>, technologies such as ocean floor trawlers allow fisherman to destroy local ecosystems for years to reel in one catch of fish. This in turn causes social and economic sustainability problems for local communities that depend on fish that no longer live in their local waters, evidenced by the cod fishing towns in Nova Scotia.

Scientific advancement, if used in conjunction with the current legal and political systems, can allow corporations to profit at the detriment of the environment and society. A clear example of this is Monsanto, as shown in the 2008 film *Food, Inc.* <sup>[4]</sup>. Monsanto was able to use innovative scientific breakthroughs to generate billions of dollars in profit for its shareholders. Monsanto's technologies have the potential to improve the lives of farmers and facilitate a move to a sustainable system, but instead are a sustainability problem. The legal prowess of Monsanto maintains the unsustainable monoculture farming system and places large economic burdens on the individuals using their product. Additionally, the technological advancements lead to social sustainability problems, because once the farmers switch to Monsanto's products, it is very difficult for them to switch back.

In a similar manner, advances in technology can extend the useful lifetime of certain unsustainable practices, and serve as barriers to implementing more sustainable systems. This is evidenced by the system of industrial agriculture, presented in the film *Fresh* <sup>[5]</sup>. Because of the ability to manufacture nitrogen-rich fertilizers, the soil's natural nutrients are no longer needed in commercial farms, leading to monoculture farming. Without this essential technology, monoculture farming would cease to be profitable and a more environmentally and economically sustainable model would replace it.

Technology can itself be a sustainability problem, and can couple with and amplify other factors to create some of the biggest problems facing society today. Through the Jevons paradox, the way it is used as a tool in the modern legal framework, and its capabilities in allowing resource exploitation, technology must be viewed not only as a potential solution but as a major sustainability problem.

Annotation References:

1. **Greene, Gregory.** *The End of Suburbia: Oil Depletion and the Collapse of the American Dream*. The Electric Wallpaper Co., 2004.
2. **Doring, Adolfo.** *Blind Spot*. Dislexic Films, 2008.
3. **Murray, Rupert.** *The End of the Line*. Arcane Pictures, 2009.
4. **Kenner, Robert.** *Food, Inc.* Magnolia Pictures, 2008.
5. **Joanes, Ana Sofia.** *Fresh*. Ripple Effect Films, 2009.

*3) Discuss the relationship between social networks (Web and Internet) and sustainability. Include problems and solutions. (839 words)*

The world today is more connected than it has ever been. With the explosive growth of the Internet and social networking platforms, the manner in which people interact and exchange information has changed. The web impacts sustainability by offering a low-cost platform for ideas to be shared, an accessible medium to share information through, and a tool to increase choices in the marketplace. At the same time, the web can create the illusion of doing good works for little expended effort on the behalf of the “activist”. Additionally, it gives companies an avenue to cheaply bombard consumers with information, much of which may be incorrect or at least biased in the company’s favor.

Specific online forums and communities allow people with similar interests separated geographically to share thoughts and ideas in a way never before possible. The effectiveness of this approach is illustrated by the success of the Transition Network, a website that encourages people to take actions in their community with support of others who are building sustainable initiatives in their own communities. The online community allows activists to explore a wealth of ideas that have been tried in other places, propose their own concepts, and get feedback and encouragement from others. The Transition Network site has built up to become a fantastic resource to anyone interested in taking a leading role in building a sustainability group within their local community.

One of the biggest problems preventing sustainable ideas from being implemented is lack of awareness. Social networks offer a potential solution to this problem. If a user sees that a large number of their friends are sharing information about a new sustainable idea or sustainability problem, they will be more inclined to learn more about the issue on their own. Through social media, a greater number of people can be exposed to the topic of sustainability. Even if learning about the issue does not spur the individual into becoming an activist, the new information can influence their purchasing and voting habits. Multiplied by the millions of users of social media, if even just a small percentage gets information this way changing votes and spending money can have a tremendous influence on the state of the world.



The Internet allows consumers more choice in the marketplace. Together with the rise of benefit corporations, the ability to order products online has allowed customers to make informed purchasing decisions based on both the product and the company. This way, consumers who are interested in sustainability are able to take sustainable actions more frequently. In the past, a consumer may be left with only one option to purchase a specific product. Now, a customer could order a product that was made in accordance with their value system from anywhere in the world. In addition to allowing customers the choice to purchase goods from anywhere, the Internet and social media also benefit small, local companies. While small business do not have advertising budgets to compete with large corporations, they can use the Internet to reach their customer base at a low cost. For example, a local bakery may encourage a customer to “like” their page on Facebook. While the customer is hit with a barrage of advertisements for cakes and snacks on television and other media, she will also see a post from her local bakery online. This helps to lessen the advertising advantage of big corporations, and helps drive traffic to local, more sustainable business that support the local community.

Furthermore, the ease of communication in social networks empowers consumers to hold corporations accountable for their actions. This serves as a powerful method to combat “greenwashing” – if a major corporation falsely claims a “green” product, consumers can point out the flaws and share with their friends. The potential for negative stories about their company to “go viral” serves to limit the amount of unsubstantiated claims a company makes. This is also the case for customer service and human rights issues, which aids cultural and societal sustainability problems.

While the Internet does a great job disseminating information on the web, individuals sometimes take action to share information about a cause or raise awareness without contributing anything substantial to the cause themselves. While this form of “slacktivism” does not inherently lead to sustainability problems, it lends a sense of inauthenticity to the cause being shared.

Another negative impact on sustainability caused by the web is through the increased channels that companies have to disseminate information about their products. Because the Internet is unregulated and free, companies have greater leeway in what claims they make for their products. Additionally, companies can present biased information (such as paid reviews) as

unbiased information. This presents a social sustainability problem where consumers are being targeted by advertisements disguised as impartial information.

Overall, the Internet and social networks are a huge advantage to sustainability. The web empowers consumers by giving them information and a way to hold corporations accountable. Additionally, the resources and supportive communities online make it easier for individuals to affect real change in their communities.

8) *Explain five (5) actions that you think the US government should take to advance sustainability. Include concrete examples to illustrate your ideas. (821 words)*

As the regulator of the world's largest economy, the US government is in a unique position to advance several key areas of sustainability for both the United States and the world. To increase sustainability on the global stage, the United States should designate additional waters as protected marine reserves. To mitigate sustainability problems in the US, the government can increase the federal gasoline tax and re-invest in the nation's rail infrastructure, institute a nationwide ban of plastic bags at grocery stores, end ethanol subsidies, and invest in elementary school sustainability education. By taking these actions domestically, the US can set a precedent and finally take a leading role internationally on sustainability issues.

In September, President Obama designated over 400,000 square miles of ocean as protected under the Pacific Remote Islands National Marine Monument <sup>[1]</sup>, protecting ocean ecosystems from commercial fishing. The United States has a history of designating federal lands for preservation, and by expanding the ocean reserve the US can set an example for other countries to combat abusive commercial fishing operations. Commercial fishing destroys marine ecosystems, and international quotas are often ignored. Unlike many other agencies looking to take action on this sustainability problem, the US has the resources to enforce an expanded fishing ban.

Closer to home, the government should raise the federal gasoline tax for the first time since 1993 to raise money for increased rail infrastructure investment. Because a flat gasoline tax would disproportionately impact low-income households, the government should impose an additional tax on purchases of new SUVs and large trucks to rebalance the total tax burden. The increased tax would discourage people from driving, which will help reduce total greenhouse gas emissions. Additionally, the increased tax would encourage people to carpool or take public transportation. At the same time, the funds raised from the tax could be used to create a modern passenger and cargo rail system in the US. The rail infrastructure in the United States is in shambles compared to the rest of the world, yet is critical to the nation's economy. Moving more passengers and goods on trains instead of cars will benefit the environment, since trains release less than one quarter of the carbon dioxide emissions of cars per passenger mile <sup>[2]</sup>.

Following the lead of California, the government should institute a nationwide ban on single use plastic bags at grocery stores. To reduce the risk of disease, meat and poultry products should be exempt from the ban. Plastic bags contribute significantly to landfill waste and ocean pollution, and are petroleum based. Adopting stricter measures on plastic bag use will help the United States long term, lowering waste management costs and environmental costs. Encouraging shoppers to use reusable bags will be a rough transition at first, but will soon become second nature and the US will reap benefits for the future.

The US should end subsidies to ethanol producers to lower US reliance on corn agriculture and encourage farmers to diversify their fields. The United States and Brazil are the only countries to use ethanol as a fuel or fuel additive. Unlike Brazilian sugarcane ethanol, the corn ethanol used in the United States is energy negative: it takes more energy to produce a gallon of ethanol fuel than is gained by using it. Additionally, the large demand for corn to be used as a fuel decreased the amount of corn available to use as food. This has caused an overall increase in food prices, not just corn. Perhaps the most damaging aspect of the ethanol subsidy is that it encourages corn monocultures. Since there is always a market to sell corn, farmers are growing just corn to be most efficient. This unsustainable practice is a threat to food security in the United States.

Finally, it is critical for the US to require sustainability education for all elementary school students. Sustainability is a complex subject, and it takes time to be able to recognize the second-order and long-term effects of actions we take. By starting education early, students can be introduced to the kind of thinking needed to conceptualize sustainability problems and possible solutions. This education will complement the STEM focus of early education by providing children with a context to where these subjects can be applied. Elementary school children are curious about the way the world works, and if we educate them more about some of the problems facing society today, more students would be excited to enter STEM fields to learn the tools they will need to help find solutions.

Because of the United States' prominence on the world stage, it can become a leader in sustainable policy and set the example for developed and developing nations. The US population has enjoyed the booming years of cheap energy, but now must face the reality that the current way of life is unsustainable. The government can help the American people transition through gradual implementation of regulations and better government systems.

References:

1. Eilperin, Juliet. "Obama to Create World's Largest Protected Marine Reserve in Pacific Ocean." *Washington Post*. The Washington Post, 25 Sept. 2014. Web. 6 Dec. 2014.
2. Kanga, Camille, and M. Anil Yazici. "Achieving Environmental Sustainability beyond Technological Improvements: Potential Role of High-speed Rail in the United States of America." *Transportation and Infrastructure* 31 (2014): 148-64.

*10) Identify five (5) the college students should take to advance sustainability. Include concrete examples to illustrate your ideas. (870 Words)*

College students are ideal for advancing sustainability, since they are most flexible and open to new ideas. Actions students take in college can become habits that they carry with them for the rest of their lives. Because of their fresh outlook on problems and open schedules, college students can take actions the general population cannot. To advance sustainability, college students can help minimize their carbon footprint by walking or biking around campus and the community instead of driving, and by using electronic media like e-readers instead of bulky textbooks. Students can also take advantage of the collegiate environment to start or join clubs looking to work on sustainable projects on campus. Additionally, students with an academic bent can work on research projects in their field of study dealing with sustainability problems. Finally, college students can give back to their local college community by volunteering to teach younger students about what it means to be sustainable.

College campuses are ideal for leaving the car at home. For small campuses, walking to classes and to local shops is a good way to help the environment by reducing emissions and is a good way to get in touch with the local community. For larger campuses, biking to classes and around town is a healthy alternative to driving. Going beyond a short term transportation solution, college students can set habits that they will keep for the rest of their lives. By establishing routines in college, students will look to live close to their workplaces and will lead healthier, more environmentally friendly lives. Additionally, students can encourage their friends and roommates to join them in choosing a more sustainable path.

Textbooks represent a significant portion of student expenses, and contribute to waste when they are either used infrequently or not at all in the years following the course they were required for. When students encourage professors to choose textbooks available online, they save themselves money and promote sustainability in the process. By starting the dialogue with faculty about sustainable choices with textbooks, students can encourage professors to go a step further. Professors can accept electronic essays submissions, distribute lecture notes electronically, and use digital assessments for multiple choice exams. College students, after years of schooling, can test out the best ways to transition to an education system based on the laptop and e-reader instead of the notebook and textbook. After college students give feedback and test out what

works and what needs improvement, the new styles can be trickled down to high schools, middle schools, and eventually elementary schools.

The campus environment, with its strong sense of community, is a good place to get peers involved in tackling sustainability issues. Many colleges have environmental or sustainability oriented clubs and organizations, and joining is a good way to advance sustainability. By organizing as group, students gain power and can attempt to address much bigger issues than any one individual. Additionally, the organization's presence on campus can help the institution itself become more sustainable through pressuring the school to establish a university garden, compost, and hold school-wide environmental conservation initiatives. After spending time as a member or as a leader of the organization, students will be prepared to take an active role in their future communities, and will have experience if they want to establish a similar group within in their future community.

College students at research institutions such as RPI can take advantage of their unique life situation to pursue research topics in sustainability that may otherwise be overlooked. After graduation, most students are assigned to work on certain projects by their employers or graduate school sponsors. But at the undergraduate level, students have no financial commitments and are free to investigate any fields that interest them. Additionally, they are able to pull on their institution's resources to perform quality research – they will find that professors are more than willing to lend a hand to an inquisitive student's investigations. No matter what undergraduate path a student takes, research advancing sustainability can be found. In social sciences, students can look into the factors that lead to sustainability problems and societal reactions to attempts to correct them. In engineering students can work to develop sustainable fuels, sustainable materials, or sustainable construction methods. Architecture students can research into efficient use of space and lighting to conserve energy. A plethora of knowledge is waiting to be discovered by motivated undergraduates free to research what they please.

Finally, students can inspire others by volunteering their time and showing their dedication and passion for their chosen path. Students in high school and middle school need to be exposed to young adults who are happy and passionate about sustainability. At this age, students are influenced less by their teachers and more by their peers, and would benefit greatly by college students connecting with younger classes. Without full time jobs to restrict them, college

students are ideal volunteers to go back to high schools and help the students learn sustainability and make sustainable choices.

College students can take full advantage of their flexible schedules and flexible minds to tackle sustainability problems in ways others cannot. Additionally, they can use their time in college to develop sustainable habits that will serve them throughout their lives.



12) *What attitudes and cultural constructs in the United States do environmental educators need to work against? Briefly describe at least one activity for k-12 students that would work against these attitudes and cultural constructs. Reference at least two films. (876 words)*

In the United States, there is a great sense of longing over the way things used to be. This presents a problem when trying to educate the population about sustainability problems in a number of key ways. The idea of the home, the grocery store, and American faith in technology are all important factors when considering how the average American thinks about sustainability. The idyllic suburban home, filled with plenty and material goods remains the goal for many college graduates even today. Complementing the suburban home, the grocery store and shopping centers remain pillars of American life. Finally, the classic American trust in technology, which has served the United States well in the past, presents a hurdle to making people think seriously about solutions to important problems.

The goal of owning a home with a backyard and white picket fence to mark your property has profound implications on the way Americans think about some of the most critical issues facing society today. A common problem when raising awareness or action about a sustainability problem is in its relevance to a local community. People are unwilling to make sacrifices in their lives unless they see the benefits locally. Legislation to reduce air pollution and smog in cities has enjoyed wide support, but legislation talking the longer term and less tangible issue of climate change has never been popular. For the American people, there is a consensus that if it is not in their backyard, it is not their problem. To successfully be educated about sustainability, Americans must realize that the white picket fence does not hold out all problems.

Brought about by suburban life and the need for convenience, the supermarket and shopping center reveal important information about the thought process of Americans. Increasingly, supermarkets and shopping centers are merging, so that consumers buy their plastic toys alongside their bread. This creates a barrier that removes the farm from the food – the food Americans eat comes from the supermarket, not the farm. By removing the farm from the equation, consumers can get a false sense of food security and do not have to worry about the ethical implications of what goes on their dinner plate. As shown by the film *Fresh* <sup>[1]</sup>, educational initiatives that show people firsthand what goes into growing their food are beneficial in getting people inquisitive about what they eat. In the Growing Power tour in *Fresh*,

the local residents were told to dig their hands into the nutrient rich dirt to understand what was necessary to grow food. Additionally, they learned about the chemical equivalent – fertilizers – and their associated drawbacks. By getting hands on exposure to the realities of agriculture, the individuals who went on the farm tour were better equipped to make knowledgeable food purchases.

Another issue that can cause issues in getting the American population to care about sustainability issues is the longstanding American faith in technology. In the United States, several technological revolutions have changed lives for the better. People's optimism, usually a benefit to society, instead leads people to not take sustainability issues seriously. People are not likely to care about something if it is an inconvenience to them and they believe someone else will fix it. Americans believe there are smart people working on the problems to develop some magical technology that will allow them to continue living their lives as they always have. If someone else is going to fix the problem anyway, then it is justified to not take action. It is important to educate people, especially children, that there is not always someone else who will solve society's problems – sometimes everyone must do their part.

One activity that could help address these issues targeted at the K-12 demographic would be a community simulation based on a scenario from the documentary *Poisoned Waters* <sup>[2]</sup>. The simulation would demonstrate how a community's decisions impact its neighbors, and eventually come back around. The students will learn how to think with long term goals in mind, and will learn to value things other than economic incentives. The students will be broken up into three groups for the basic simulation: a group of fishermen, a group of textile workers, and a group of farmers. The textile workers live in a community along a riverbank, and they have a factory that makes t-shirts with some wastewater pollution as a byproduct. The fishermen live downstream of the factory and the amount of fish available to catch is set by the pollution level of the river and what the previous year's catch was. All three communities trade with each other, and want as much of each other's product as they can buy. In the simulation, the kids will see that when the textile workers try to increase production, the pollution will affect the community downstream and eventually the loss of fish will hurt them. Additionally, the fishing community will discover that it cannot simply fish as much as possible if it wants to have a sustainable catch. The farming group will find that it cannot overextend itself in trade with the others before the economy

collapses. The students will all learn to consider the impact of their decisions on the other communities, and that economies must consider all factors to be sustainable.

Annotation References:

1. **Joanes, Ana Sofia.** *Fresh*. Ripple Effect Films, 2009.
2. **Young, Rick.** *Poisoned Waters*. FRONTLINE, 2009.